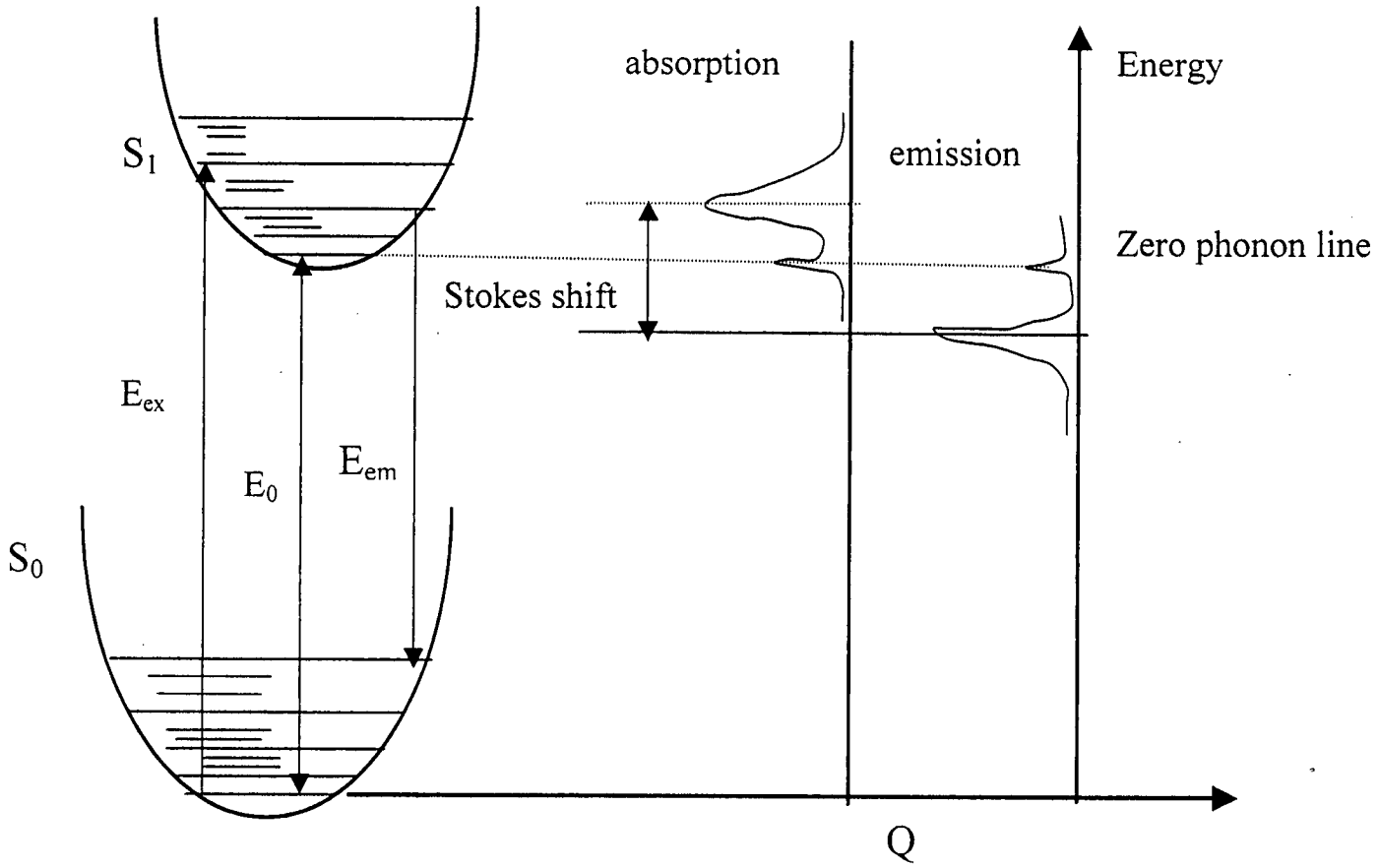
absorption
Energy
emission
S_1
Zero phonon line
Stokes shift
E_{ex}
E_0
E_{em}
S_0
Q

Fig. 1

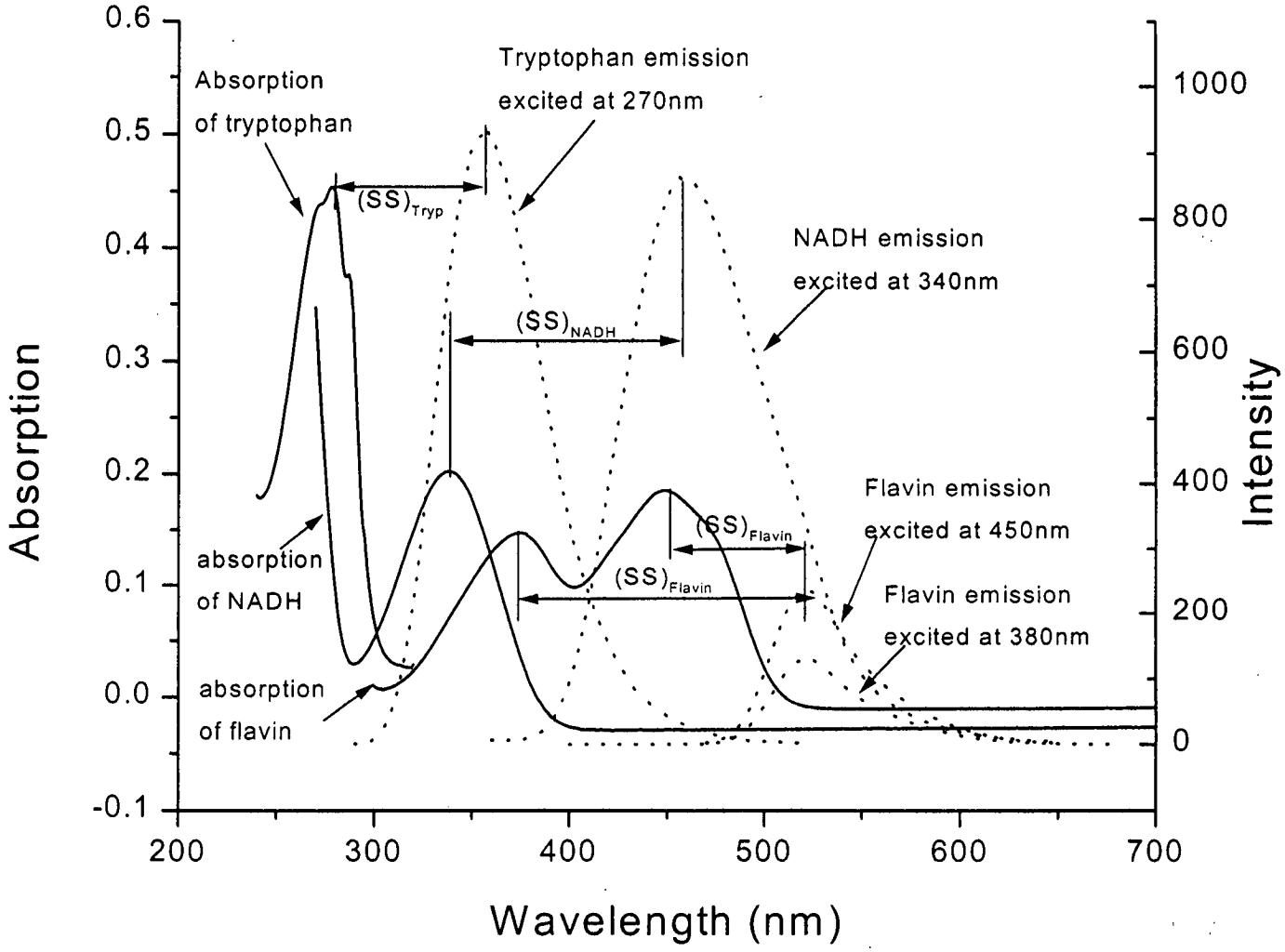
Absorption
Intensity
Wavelength (nm)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
1000
800
600
400
200
0
200
300
400
500
600
700
Absorption
of tryptophan
Tryptophan emission
excited at 270nm
(SS)Tryp
NADH emission
excited at 340nm
(SS)NADH
Flavin emission
excited at 450nm
(SS)Flavin
(SS)Flavin
Flavin emission
excited at 380nm
absorption
of NADH
absorption
of flavin

Fig. 2

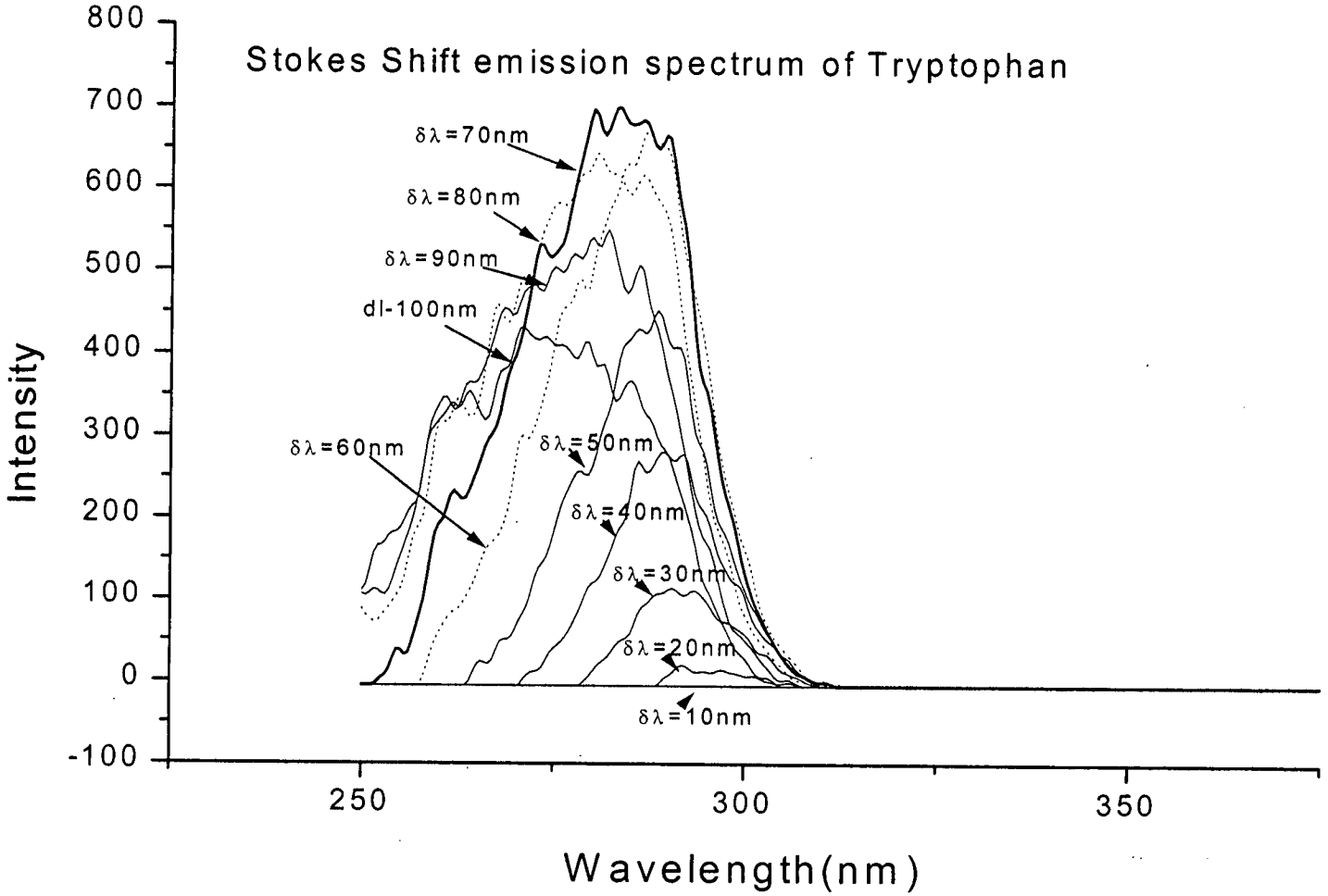
Stokes Shift emission spectrum of Tryptophan
δλ=70nm
δλ=80nm
δλ=90nm
dl-100nm
δλ=60nm
δλ=50nm
δλ=40nm
δλ=30nm
δλ=20nm
δλ=10nm
Intensity
800
700
600
500
400
300
200
100
0
-100
250
300
350
Wavelength(nm)

Fig. 3

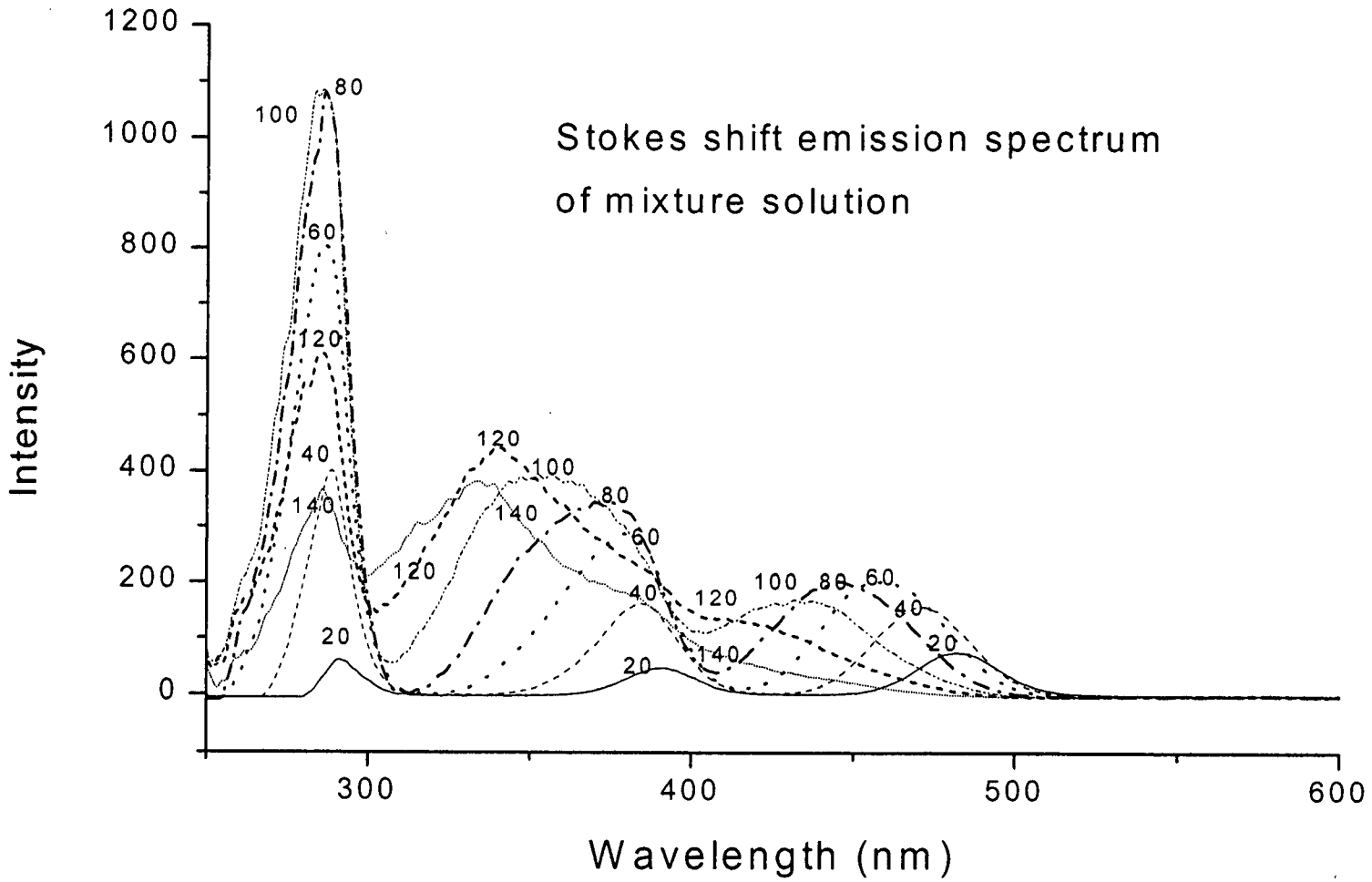
Stokes shift emission spectrum
of mixture solution
Intensity
Wavelength (nm)
1200
1000
800
600
400
200
0
300
400
500
600
100
80
60
120
40
140
20

Fig. 4

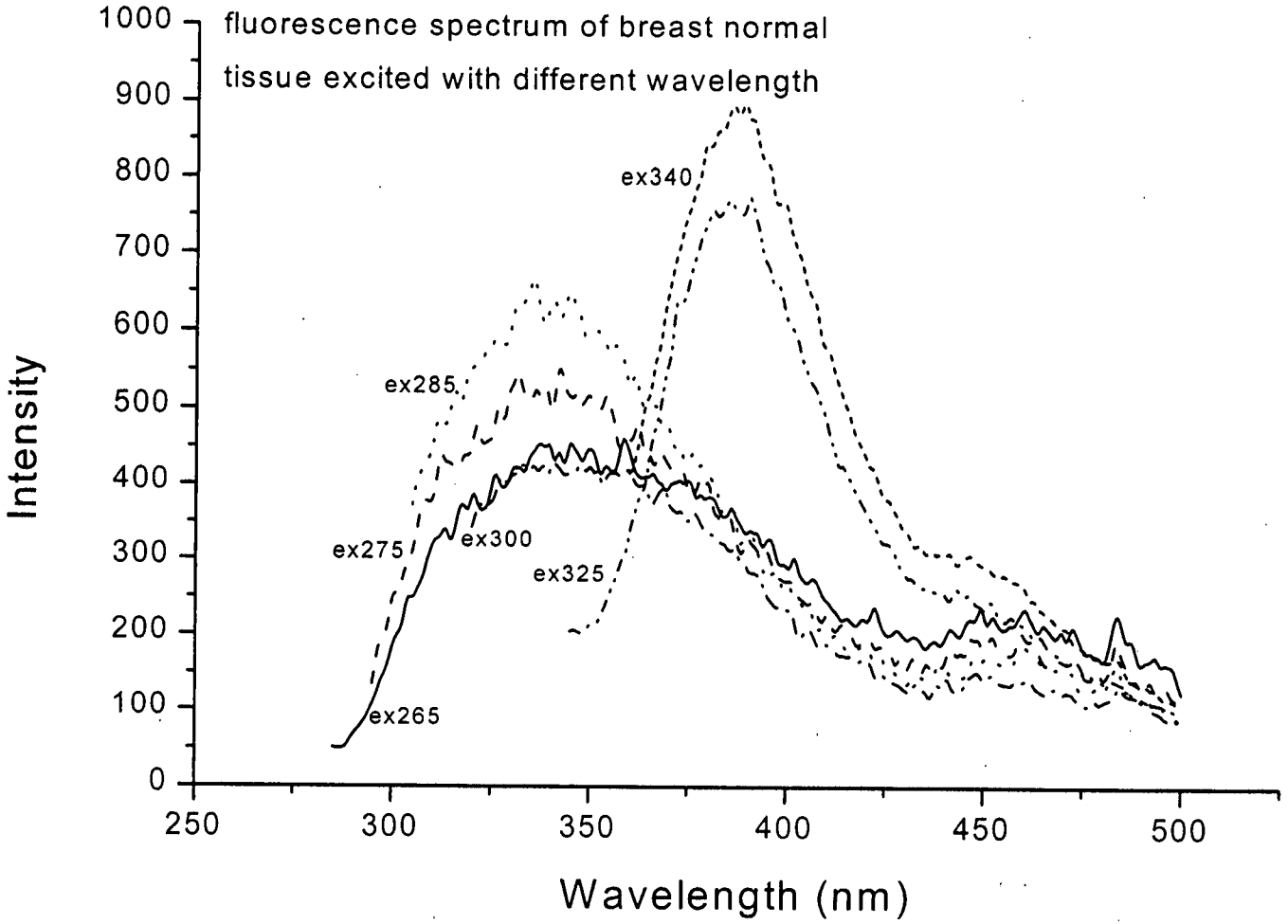
fluorescence spectrum of breast normal tissue excited with different wavelength
Intensity
Wavelength (nm)
1000
900
800
700
600
500
400
300
200
100
0
250
300
350
400
450
500
ex340
ex285
ex275
ex300
ex325
ex265

Fig. 5

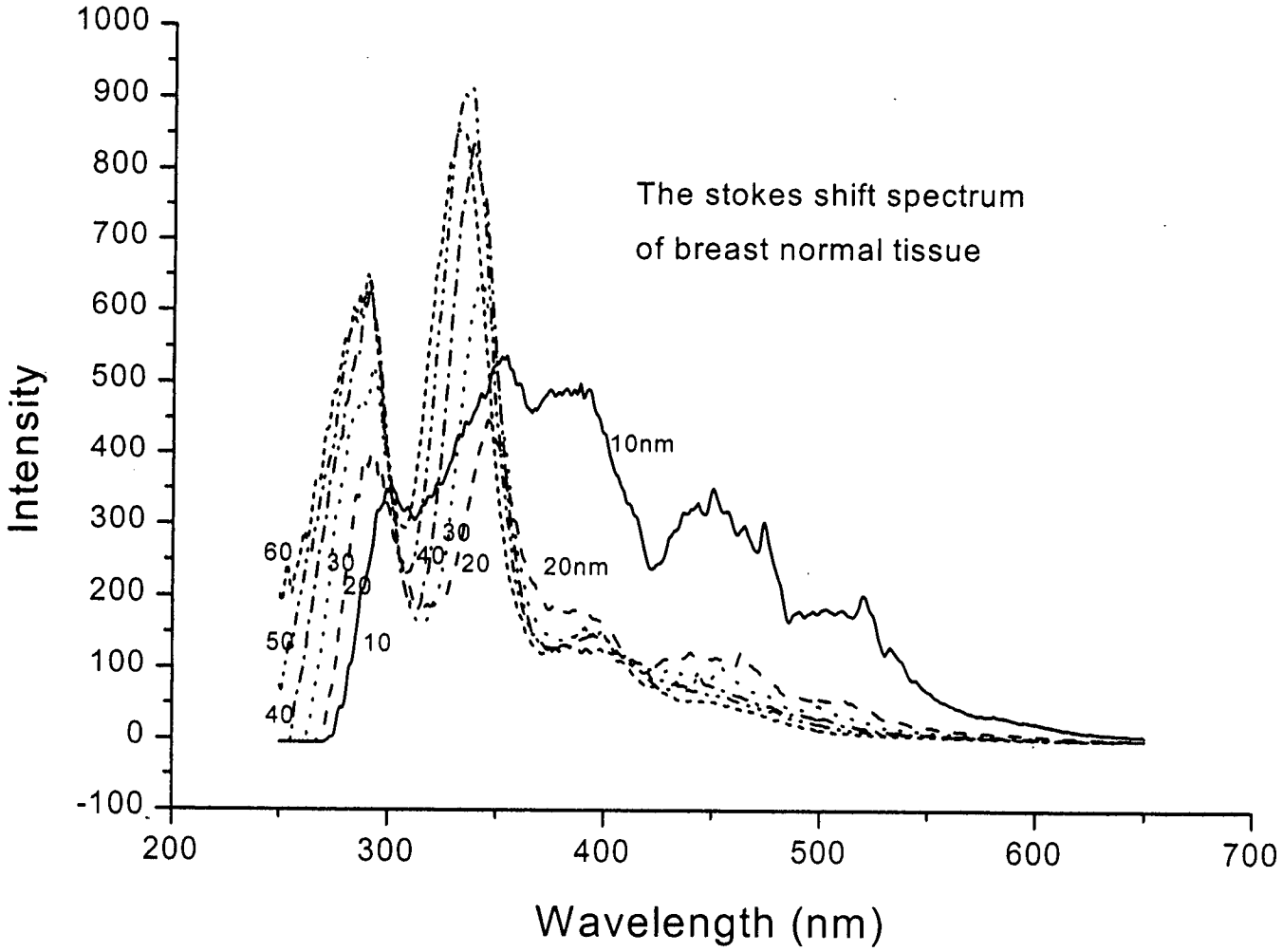
The stokes shift spectrum
of breast normal tissue
Intensity
Wavelength (nm)
1000
900
800
700
600
500
400
300
200
100
0
-100
200
300
400
500
600
700
10nm
20nm
60
30
20
50
10
40
30
40
20

Fig. 6

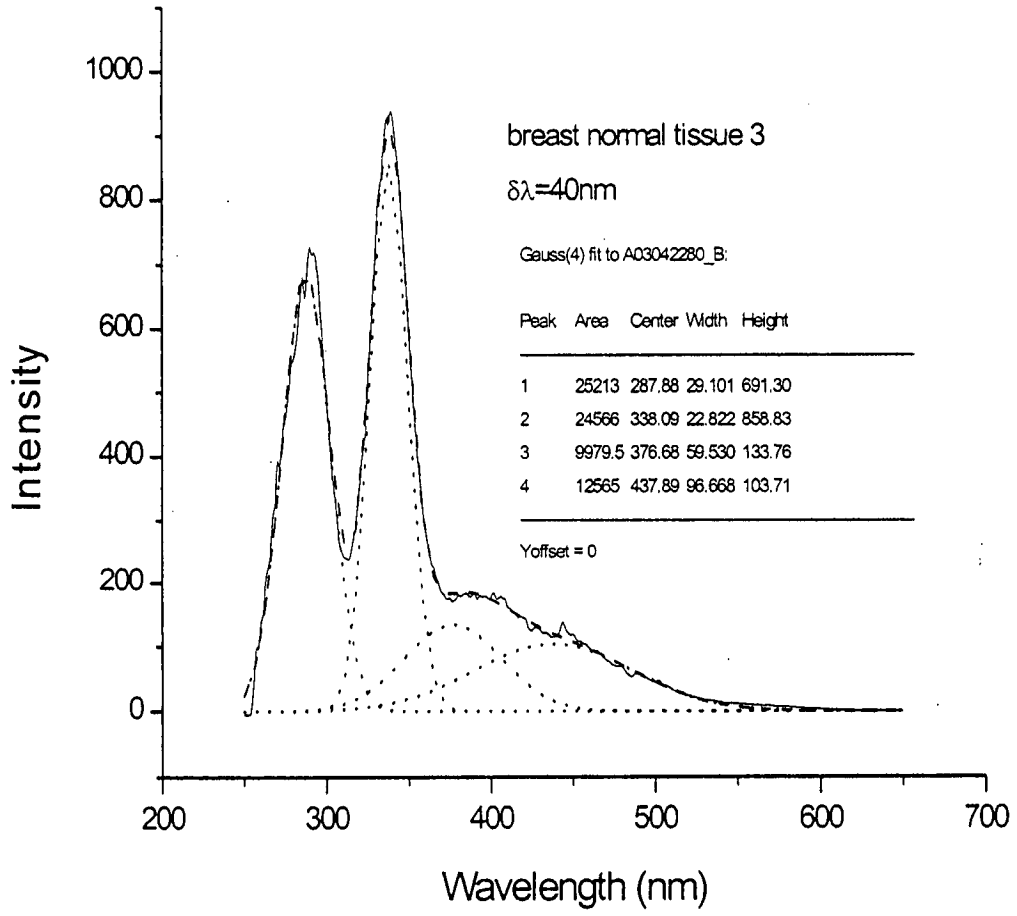
breast normal tissue 3
δλ=40nm
Gauss(4) fit to A03042280_B:
Peak Area Center Width Height
1 25213 287.88 29.101 691.30
2 24566 338.09 22.822 858.83
3 9979.5 376.68 59.530 133.76
4 12565 437.89 96.668 103.71
Yoffset = 0
Intensity
Wavelength (nm)
0
200
400
600
800
1000
200
300
400
500
600
700

Fig. 7

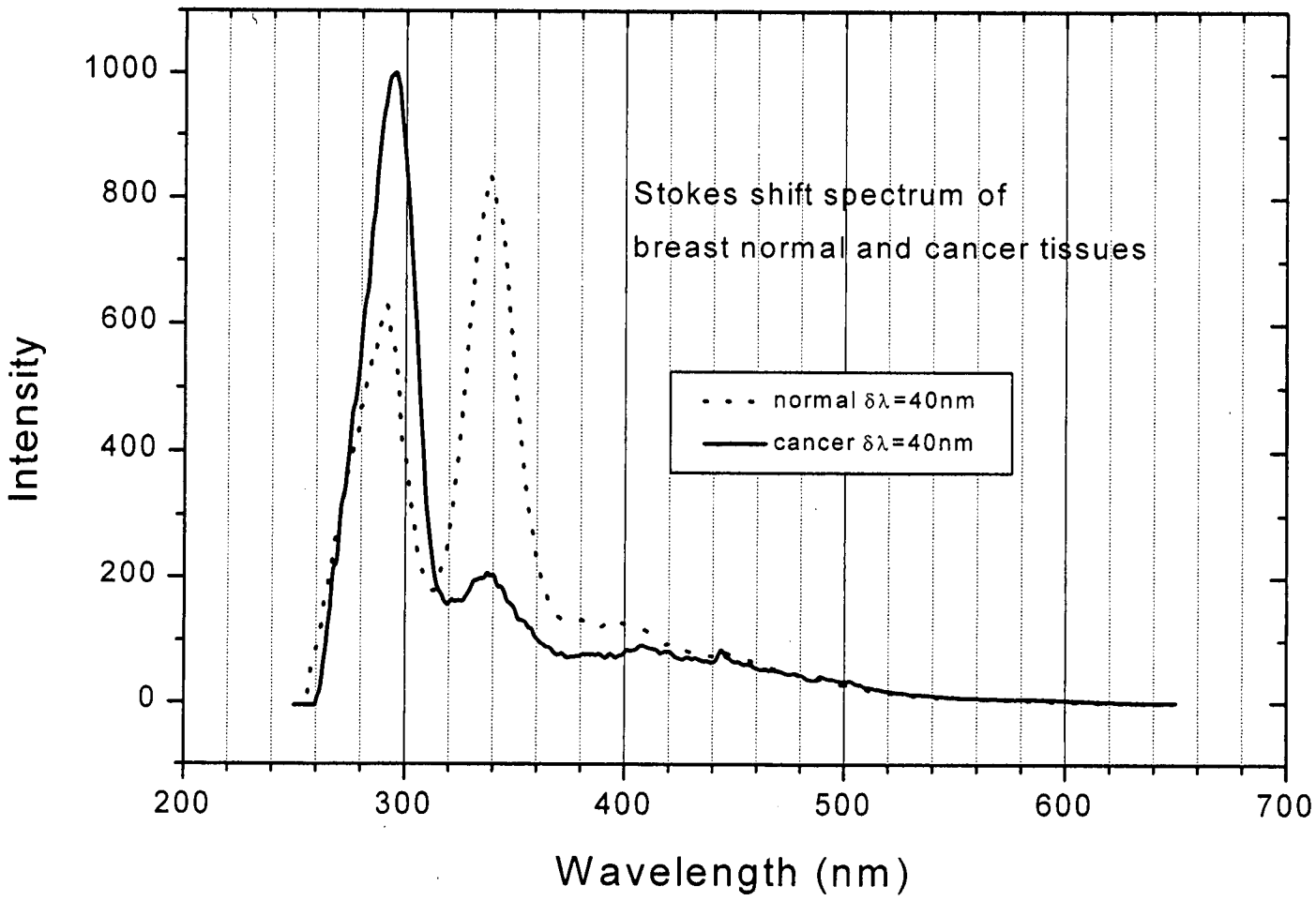
Stokes shift spectrum of
breast normal and cancer tissues
normal δλ=40nm
cancer δλ=40nm
Intensity
Wavelength (nm)
0
200
400
600
800
1000
200
300
400
500
600
700

Fig. 8

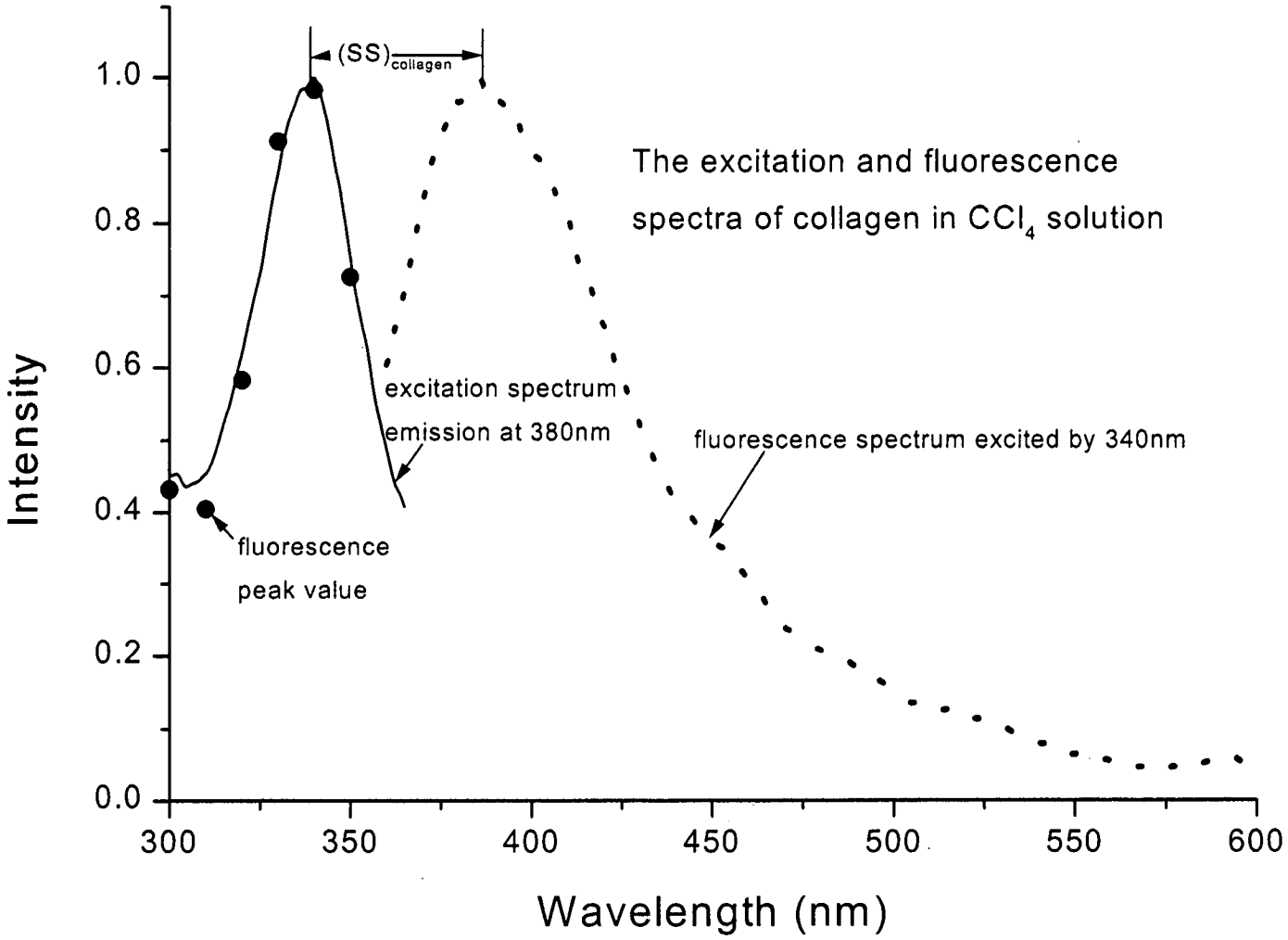
(SS)collagen
The excitation and fluorescence spectra of collagen in CCl4 solution
excitation spectrum
emission at 380nm
fluorescence spectrum excited by 340nm
fluorescence peak value
Intensity
Wavelength (nm)
0.0
0.2
0.4
0.6
0.8
1.0
300
350
400
450
500
550
600

Fig. 9

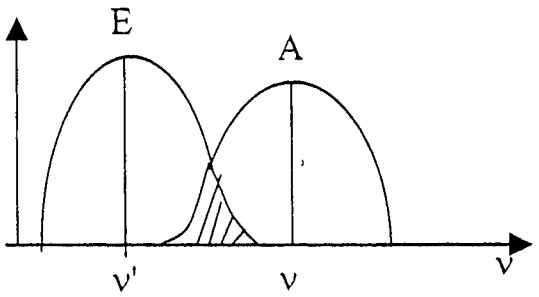

Fig. 10a

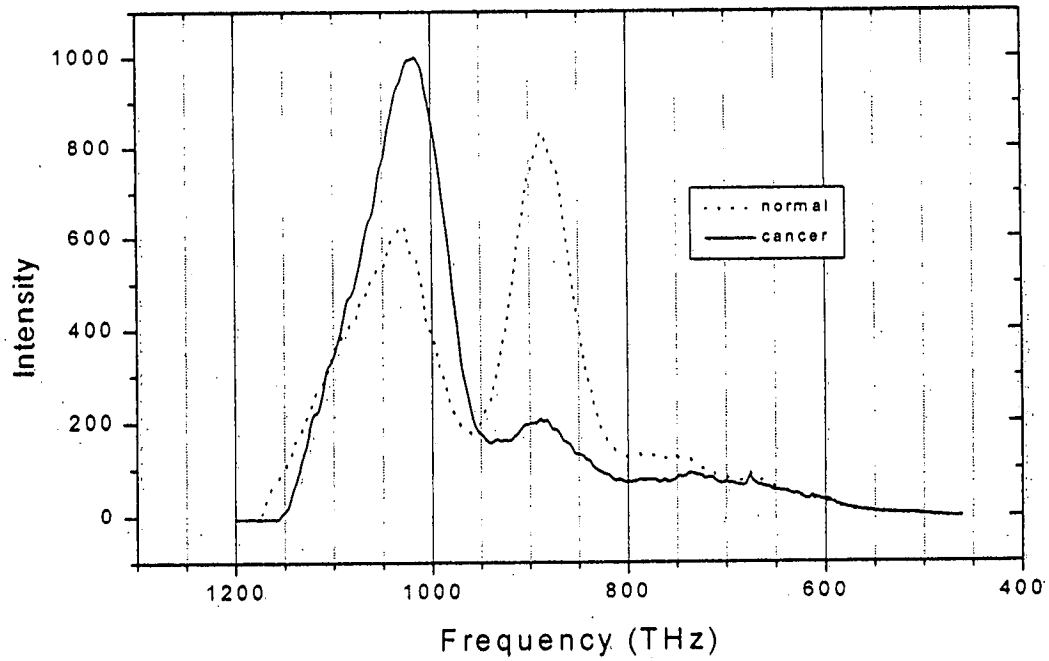
1000
800
600
400
200
0
Intensity
1200
1000
800
600
400
Frequency (THz)
normal
cancer

Fig. 10b

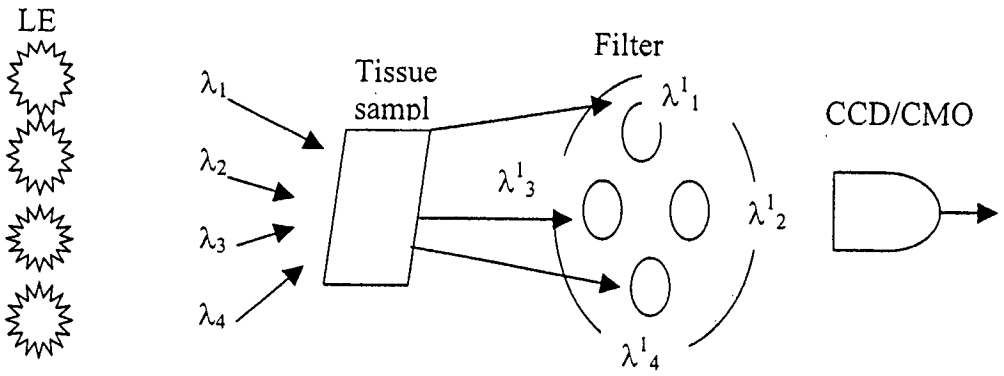

Fig. 11

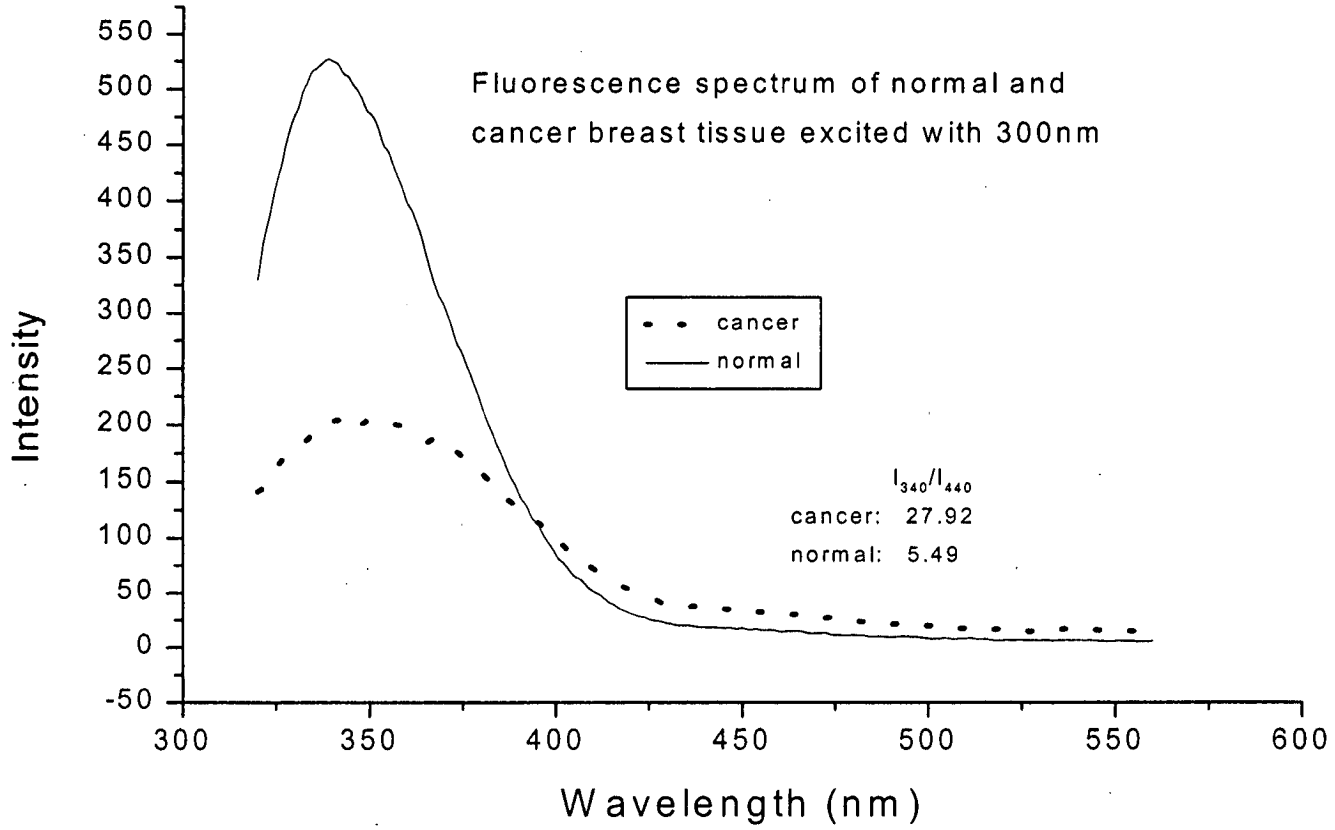
Fluorescence spectrum of normal and
cancer breast tissue excited with 300nm
cancer
normal
I_{340}/I_{440}
cancer: 27.92
normal: 5.49
Intensity
Wavelength (nm)
550
500
450
400
350
300
250
200
150
100
50
0
-50
300
350
400
450
500
550
600

Fig. 12